

The US Housing Bust and Soaring Oil Prices: What next for the world economy?

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Abstract

This paper estimates the impact of the ongoing housing bust and oil price boom on the US and European economies. It finds that large house price movements (changes in construction investment) are useful to predict exceptionally bad and good times for the US economy, but not for most large European countries. In Europe housing market developments have led to extreme values of GDP, mainly in the UK, Spain and some Nordic countries.

Exceptionally good or bad times are defined as realisations of the output gap (the difference between actual and trend GDP) that fall in the 5% tail of the distribution. Our definition of a 'bad time' thus does not necessarily imply a recession, which is officially defined as two consecutive quarters of falling GDP (and employment). A prolonged period of sub par growth could also lead to an equivalent output gap.

Our model allows us to estimate the probability of the US and European economies experiencing exceptionally bad times. We find that the probability for the US is over 50% if one assumes that house prices will continue to fall throughout 2008. Adding the high oil price to the picture increases this probability to over 80%.

For most European countries we find a much lower probability; except for Spain, where the probability of a large output gap will rise to over 85 % by the end of 2008 if house prices were to fall as much as in the US.

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THE US HOUSING BUST AND SOARING OIL PRICES: WHAT NEXT FOR THE WORLD ECONOMY?

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CECILIA FRALE & DANIEL GROS*

Introduction

The acute phase of the financial market problems that started in the summer of 2007 now seems to be coming to an end. This is the right time to focus once more on the fundamentals that caused the crisis in the first place. The key factor that drove the build-up of the imbalances that subsequently gave rise to the crisis was obviously the boom (and now bust) in housing markets, mostly in the US, but also in a number of other countries. It has now been amply documented (IMF, 2008; Gros, 2006, 2007) that house prices had risen a long way above longer term trends in most industrialised countries (except Germany and Japan).

There can be little doubt that increasing house prices fuelled growth up until about 2007. As house prices are now falling almost everywhere the question arises as to whether the bust in housing will also lead to a bust in the wider economy. One purpose of this paper is to test the likelihood of this scenario.

Falling house prices are not the only factor influencing growth prospects in the US and Europe. Another rapidly developing threat to growth comes from the seemingly inexorable increase in oil prices, which in real terms are now close to the levels last seen during the oil crises of 1973 and 1981. The last two occasions oil prices spiked, the world economy experienced a recession so the question arises as to whether the current level of oil prices is also likely to have a strong negative impact on growth. It is often argued that the present run up in oil prices is different because it is not due to a disruption of supply, but rather a strong growth in demand from emerging market economies. However, for industrialised countries like the US and Europe, it does not really matter whether the supply of crude oil that is available to them falls because OPEC decides to lower output (as in 1973 and 1981) or whether the available supply is increasingly going to other countries (EMEs, mainly China).

Moreover, the data suggests that oil (and in general commodity) prices tend to move together with house prices (in industrialised countries). The peak of crude oil prices in both 1973 and 1981 coincided in both cases with a sharp turning point for house prices (at least in the US): before the peak in oil prices they were increasing, but fell thereafter. This is not surprising, since higher oil prices lower the purchasing power of consumers in industrialised countries, which should lead to decreased demand for non-tradables, such as housing.

Industrialised countries are thus currently facing a triple shock: an increase in the risk premium because of financial market stress, a fall in house prices and deterioration in terms of trade due to higher commodity prices. While monetary policy seems to have some success in alleviating the first it remains to be seen how the remaining two risk factors will impact on the US and European economies.

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The recent mortgage crisis in the US has reignited the debate about the link between the housing market and the business cycle. Despite a general consensus that asset prices affect the real economy through several channels, such as wealth effect, financial accelerator and investment Tobin's Q, there is no general consensus on why this is the case. In particular, as the last WEO report from the IMF pointed out, in spite of a general consensus about the importance of the housing sector for the economic activity, it is not clear overall how and in what measure residential investments affect the business cycle, nor how house prices influence consumer spending. Quite surprisingly, the IMF recognises the central role of house price inflation in economic stabilisation through monetary policies, especially in countries with developed mortgage markets.

We perform an empirical analysis in this paper of the likelihood of good/bad times arising from large swings in both the real estate sector and the price of crude oil. This analysis then allows us to answer the question: "how likely is it that the US (or the European) economy will experience a significant fall in output given that house prices are now falling rapidly and given that oil prices are reaching record levels?" We prefer this way of putting the issue to the more usual question: "can the US avoid a recession?" because a prolonged period of sub par growth (which technically would not constitute a recession) could lead to a loss of output as large as, or potentially even larger than, a sharp, but short contraction of output (which would qualify as a recession). We define a 'bad time' of output as a situation whereby actual output is below potential by an amount that is so large that its probability of happening is only 5%.

We find that, for the US, house prices (and residential investment) do have a strong impact on the likelihood of extreme deviations of GDP from potential. By contrast, in Europe this is not generally the case. Within Europe house prices are significant for predicting large output losses only in Scandinavia, the UK and Spain.

Our estimates suggest that given the present rate of decline in house prices in the US and given that oil prices are close to US\$100 /barrel, the likelihood of a 'bad time' for the US GDP is close to 80%. This is not necessarily a prediction of a recession in the US as our measure refers to output relative to potential. If growth in the US were to continue at below 1% (p.a. which was the pace during Q1 2008) the US would still experience an output gap early next year of close to -2% of GDP, which would constitute a 'bad time'. See Figure 1.

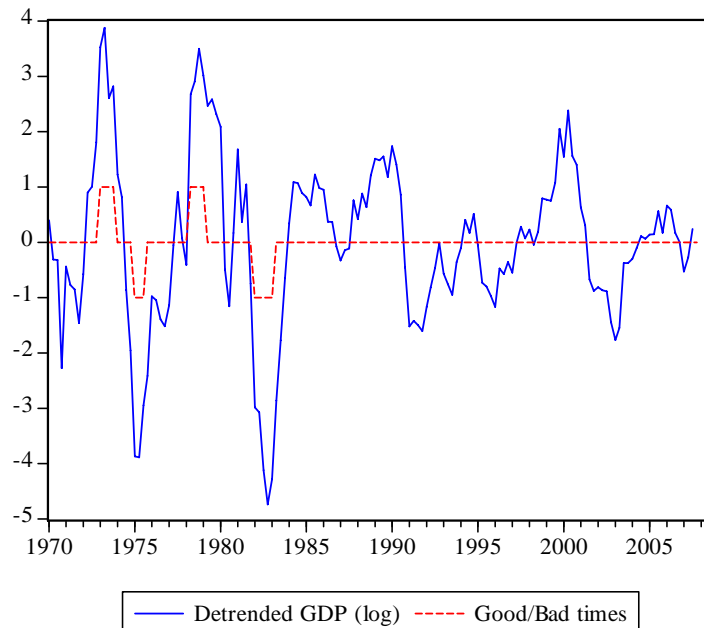
Housing markets and bad times

This paper aims to investigate the interrelationship, if any, between the housing market and the business cycle, by answering the following research question: do large swings in both the real estate sector and crude oil price lead to extreme events in GDP¹?

We make use of a definition of GDP bad/good times that mainly corresponds to an output gap above (or below) 2%, which gave rise to numerous events in the period before mid-1980s, but not afterwards (see Box 1. for some details on the 'great moderation').

¹ In addition to GDP we have investigated the link between the housing market and employment, unfortunately without relevant results. This is probably related to two empirical issues: first of all the employment cycle lags with respect to the GDP cycle, and secondly the response of employment to negative/positive shocks in the real estate market is not stable in terms of time reaction and amplitude.

Figure 1. Historical GDP bad/good times in the US



Note: Good/bad times in GDP are defined using an indicator variable that takes values: -1=GDP in left 5% tail of the distribution, 1=GDP in right 5% tail, 0 otherwise.

Source: ISF statistics and own calculations.

Box 1. The effect of great moderation

There exists a broad consensus that most macroeconomic time series have become less volatile in the last 20 years in the US and GDP is among them. This phenomenon, commonly known as the 'great moderation', has been widely investigated in the literature with the aim of finding the main drivers that produced this sort of general reduction in volatility. Although there is not full agreement about the exact starting point in time of the great moderation, 1984 is commonly recognised as the year marking this change.

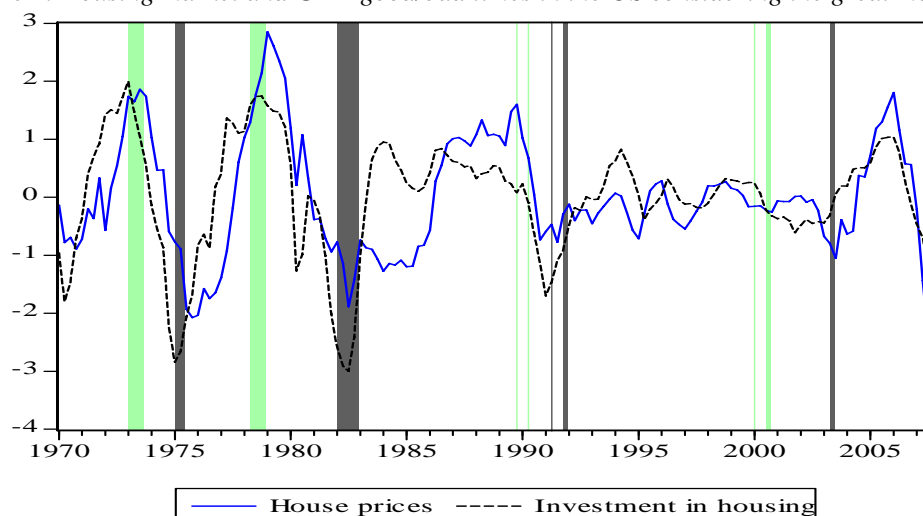
As a matter of fact, Figure 1 produces clear evidence of a break in the amplitude of the cycle of GDP in US in the mid-1980s, which is confirmed by observing that its sample standard deviation in the last 20 years dropped to 60% of the variation in the total sample.

There is no doubt that the definition of 'good/bad times' used in the econometric analysis is affected by changing volatility in time; nevertheless we show in the following that the main conclusion about the predictive power of real estate market developments for the business cycle is not invalidated when the 'great moderation' is accounted for.

A simple way to take account of the reduced volatility is by computing the 'bad/good times' after the mid-1980s according to the distribution of GDP in the restricted sample for the period 1985-2007. This has the effect of increasing the number of extreme events, as shown by Figure 2.

Box 1. cont.

Figure 2. Housing market and GDP good/bad times in the US considering the great moderation



Note: The dark grey (light green) vertical shaded areas correspond to periods of GDP in 5% left (right) tail of its distribution.

Hence, by using this definition accounting for the great moderation effect, we re-estimate the model for the probability that the real estate market determines the business cycle good/bad times. As before, we also include the crude oil price in the estimation and we allow for lags. Estimated results are reported in Table 1. See below for the basic equation and for a fuller version of the model where the crude oil price is entered contemporaneously with the other variables before 1985 and lagged afterwards.

Table 1. Ordered probit estimates for good/bad times in US accounting for the great moderation effect

Model 1	Coefficient	Prob.
Investment in housing	7.05	0.0000
House prices	13.15	0.0523
Oil prices relative to GDP per capita (-5)	0.00	0.0363
Model 2	Coefficient	Prob.
Investment in housing	6.51	0.0002
House prices	14.92	0.0295
Oil prices relative to GDP per capita (-5)*I(1985-2007)	0.00	0.055
Oil prices relative to GDP per capita*I(1970-1984)	0.00	0.0867

Note: The dependent variable assumes value as -1, 0, 1 as for GDP in the left 5%, central 90%, right 5% of the distribution respectively.

After 1985 the tails are computed considering the restricted sample 1985-2007

Prob. is the p-value and should be compared with the standard 0.05

Oil price (-5) indicates that the variable enters with a lag of 5 quarters in the model.

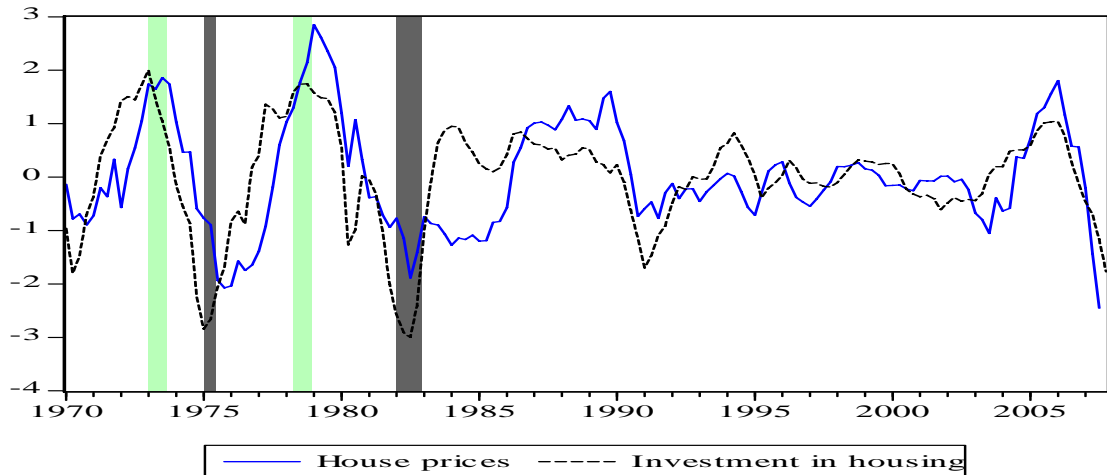
I(1985-2007) is the indicator function for the period 1985-2007 and similarly I(1970-1984)

Regardless of the model chosen, the simplest or the more detailed, the main conclusion is that the real estate market significantly determines the probability of good/bad times for GDP in US. Moreover, the estimated probabilities of a bad time for the fourth quarter of 2008, assuming the same trend for the indicators as before, are respectively: 31%, 34%, 48% and 68% with the simplest model and 32%, 37%, 53% and 73% if the fuller formalisation is used.

The bottom line of this robustness check is that the great moderation argument does not affect our results on the impact of the housing market on the business cycle.

It is useful to start with a visual examination of the data, as shown by Figure 3, where we plot the quarterly detrended² housing price and investments in the residential market in the US from 1970 to 2007. Situations of good/bad times correspond to shaded green/grey areas.

Figure 3. Housing market and GDP good/bad times (5% tail) in the US

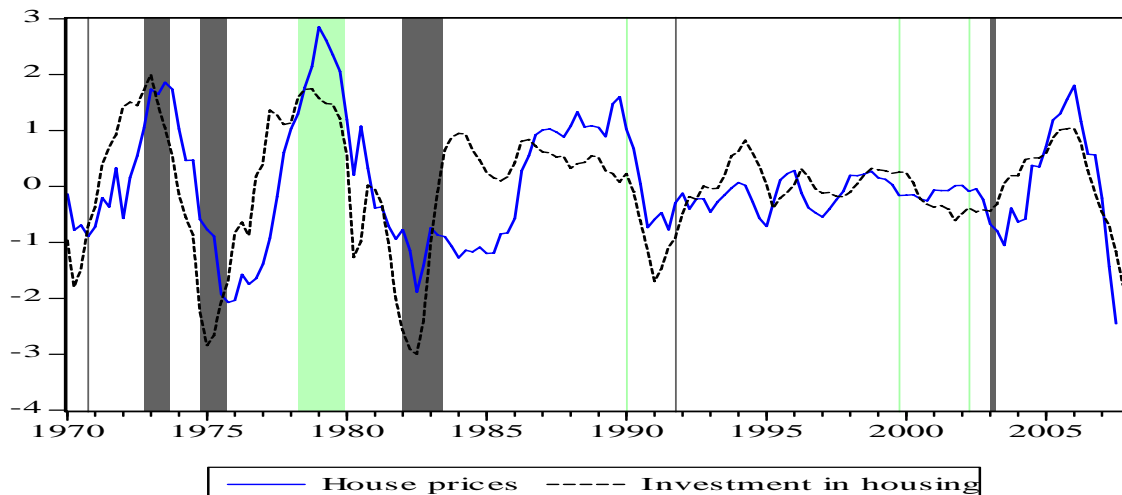


Note: The dark grey (light green) vertical shaded areas correspond to periods when GDP falls in the 5% left (right) tail of its distribution. This graphical framework is used for similar plots henceforth.

Source: Real GDP is taken from ISF statistics; housing prices come from the AMECO database and investments in the residential sector are taken from the US NIPA and Eurostat National Accounts.

The visual coherence between shaded areas and the housing market cycle, at least for the period before mid-1980s, is quite strong. The same experiment, with a wider definition of good/bad times (e.g. 10% tail) confirms this impression for recent years (Figure 4).

Figure 4. Housing market and GDP good/bad times (10% tail) in the US

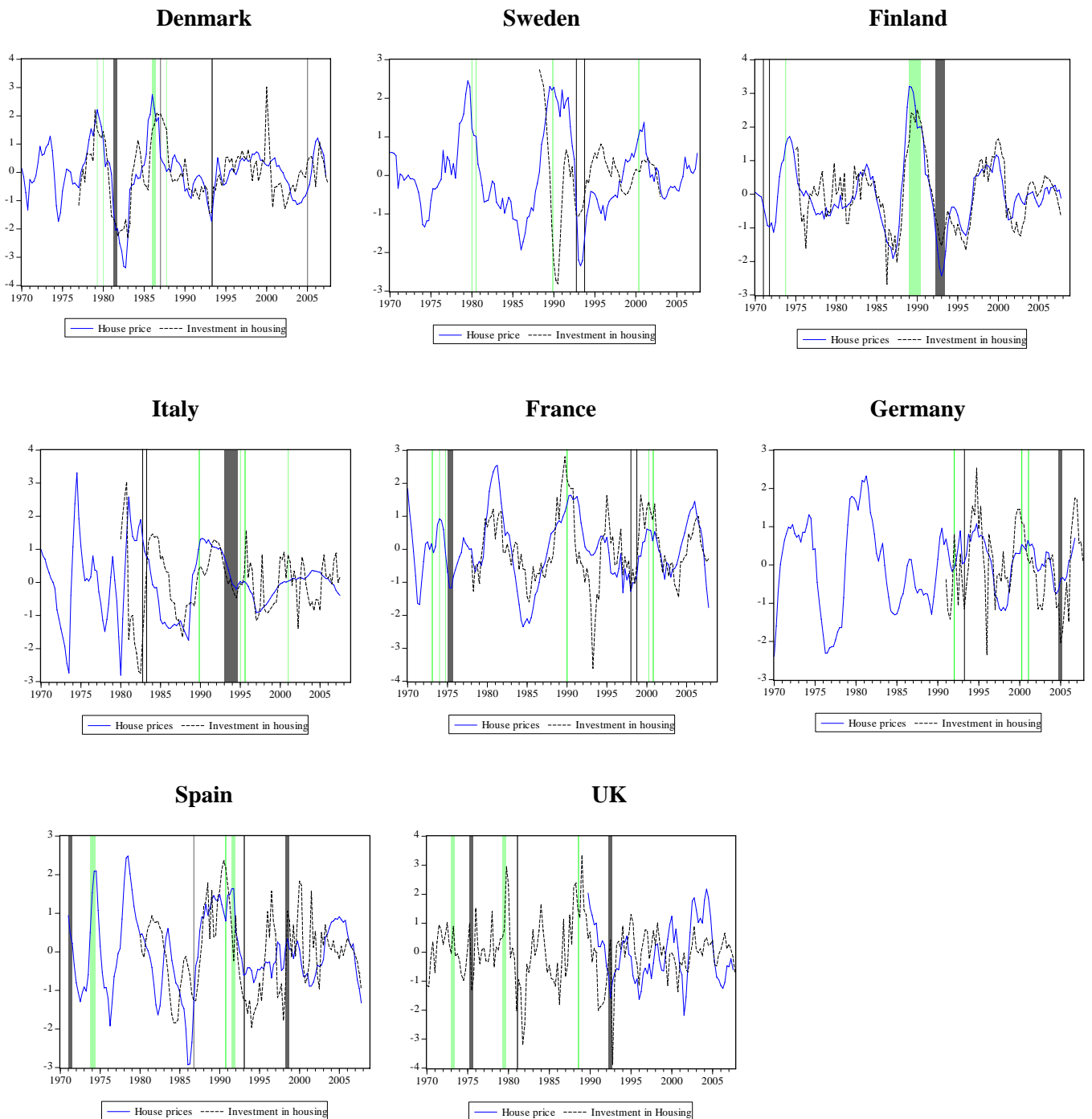


² All data are seasonally adjusted and detrended by using the Hodrick-Prescott filter. As we are aware of the limitations of this tool, we leave the application of more complex filters for future discussions.

Moreover, a change in the dynamics is visible in the 1980s: in spite of a high degree of synchronisation and high amplitude of the cycle in house prices and residential investments up in the mid-1980s, over the last 30 years the coherence of the two series is much smaller, as is their variance.

If we draw the same graph for EU countries, the picture emerging is not as clear as for the US, although for a group of Nordic countries (Denmark, Finland and Sweden) we still observe some coherence between housing prices and GDP good/bad times.

Figure 5. Housing market and GDP good/bad times (5% tail) in Europe

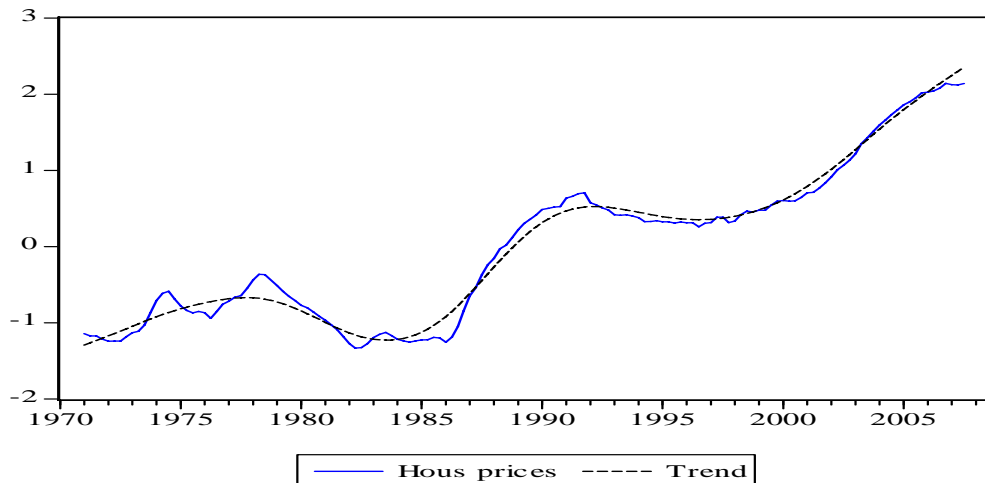


Box 2. On the interpretation of the detrended series

It might be worth clarifying that in order to avoid any misinterpretation of the cycle dynamic, as plotted in Figures 1-5, we should bear in mind the level of its trend.

Consider the case of Spain, for example for which we report the housing prices along with the GDP trend: in Figure 6 the recent cycle slowdown is a result of an incredibly steep trend in the previous 20 years.

Figure 6. Housing prices and their trend in Spain



The steep decline in the cycle visible in former figures should therefore be viewed in the light of this consideration.

The graphical evidence suggested by Figures 3 and 5 could be reinforced by a more formal analysis, e.g. estimating an econometric model for the probability of good/bad times in GDP, conditional on the real estate market (house prices³ and investments in the residential sector). The model can be as complicated as we wish, adding dynamics and additional variables, but we have opted for simplicity.

For every country under consideration we developed an ordered probit model defined as follows:

$$y_t = \alpha \text{ housprice}_t + \beta \text{ investment}_t + \varepsilon_t$$

where the dependent variable y_t aims at capturing outliers in the GDP cycle and is defined as follows:

³ As a benchmark we estimate the same model for the US by using the S&P/Case-Shiller US National Home Price Index. Unfortunately this index is available from 1987 and does not include the two market crises of 1973 and 1981. The econometric analysis is then invalidated because of the limited number of events in the dependent variable.

$$y = \begin{cases} -1 & \text{if } GDP \leq \tau_5 & \Rightarrow & \text{Bad time} \\ +1 & \text{if } GDP \geq \tau_{95} & \Rightarrow & \text{Good time} \\ 0 & \text{otherwise} & \Rightarrow & \text{Normal time} \end{cases}$$

where τ_5 and τ_{95} are the 5th and 95th quartile of the distribution of the detrended GDP (and similarly for the 10th and 90th quartiles).

The two explanatory variables are house prices and investment in construction expressed as a deviation from the trend, as shown by former Figures. A standard error term ε_t completes the model.

Table 2. Cross section ordered probit estimates for GDP good/bad times

Sample	Country	GDP in 5% extreme tails		GDP in 10% extreme tails	
		House prices	Investment in housing	House prices	Investment in housing
1970Q1:2007Q3	US	17.04 **	16.25 **	0.36 **	7.94 **
1988Q2:2003Q1	SWE	0.25 **	0.01	0.20 **	0.01
1972Q1:2007Q3	DNK	0.12 **	0.01	0.10 **	0.01
1975Q1:2007Q4	FIN	0.31 **	0.01	0.20 **	-0.02
1980Q1:2007Q4	ES	0.06 *	0.06	0.07 **	0.18 **
1978Q1:2007Q4	FR	0.02	0.21 **	0.06	0.22 **
1980Q1:2007Q3	IT	-0.01	0.09	-0.01	0.08
1989Q4 2007Q4	UK	0.09 **	0.06 **	0.12 **	0.08 **
1991Q1:2007Q4	DE	0.23	0.19 **	0.24	0.21 **

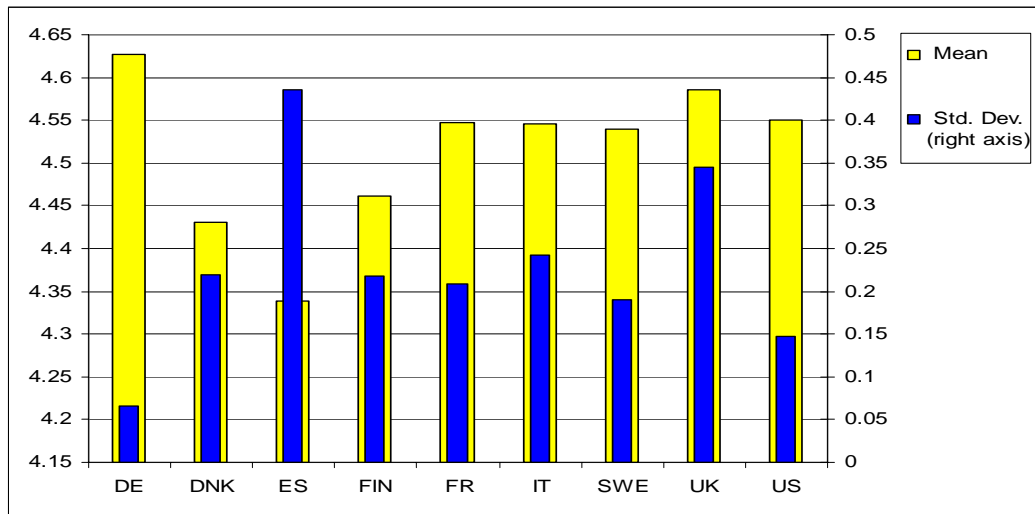
** Significant at the 5% level. * Significant at the 10% level.

Estimated results, reported in the previous table, show that in the US the probability of good/bad times in GDP (with the definition based on a 5% tail and a 10% as well) is driven by both house prices and investments in the residential market.

As for the Scandinavian countries, house prices are still relevant for GDP good/bad times, while investments are not. On the contrary, for the other European countries, the probit regression suggests that (at least in the past) the real estate market did not have a significant impact in leading to extreme GDP events, except for in the UK and partially for Spain.

This result is not surprising since Spain and the UK are the two countries in Europe with the biggest variation in housing prices (twice the average variation of EU countries for Spain and 1.5 times for the UK, as shown by Figure 7). Moreover, these two countries also have more developed mortgage markets, which should increase the impact of house prices on consumption (and investment) as shown in IMF (WEO 2008) and Muellbauer (2008).

Figure 7. Sample mean and standard deviation of house prices in different countries



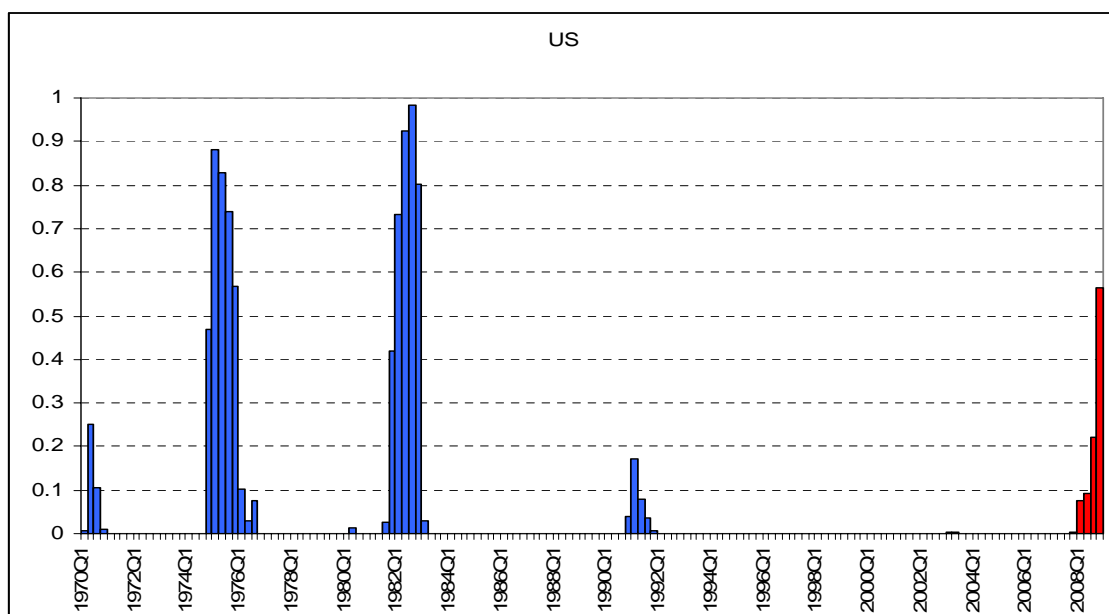
Note: The comparison between countries should be carried out with caution because of the different sample size of the data in different countries, as reported in the first column of Table 1.

Implications: The likelihood of good/bad times

Based on these results, the question that arises is: what is the probability of a bad time in the near future? Our model can provide an answer to this. Starting from a baseline hypothesis that projects the recent trend of the two indicators 1 year on, namely a constant yearly decrease of house prices by 5% and a monthly slowdown of investments by 2%, we obtain the estimated probabilities for the US as shown in Figure 8. In particular, for the four quarters of 2008, the estimated probabilities of a bad time in the US correspond to: 8%; 9%; 22%; 56%.

Thus for the end of 2008 we have a probability bigger than 50% of seeing the US GDP being strongly below its trend; a fact that has not occurred since the 1980s.

Figure 8. Estimated probability of a bad time (5% left tail) in the US



As far as European countries are concerned, we do not have empirical evidence of a significant relationship between the business cycle and the housing market, except for the UK and Spain (only a 10% tail).

It is widely expected that Spain will experience a housing bust at least as strong as that of the US given that prices there have increased even more than in the US and investment in construction has reached a level that far exceeds the American one as well (see Gros, 2007). However, using actual data until up to the end of 2007, when the housing sector was not yet in full decline, the probability remained below 30%.

The estimated parameters imply that for Spain the probability that the country will fall on a bad time increases substantially during 2008, when we might assume a decline in investment and house prices as deep as in the US. The associate probabilities increase substantially over the four quarters of 2008: going from 5% to over 85% at the end of the year.

The same probabilities for the UK never exceed 5%.

Figure 9. Estimated probability of a bad time (10% left tail) in Spain

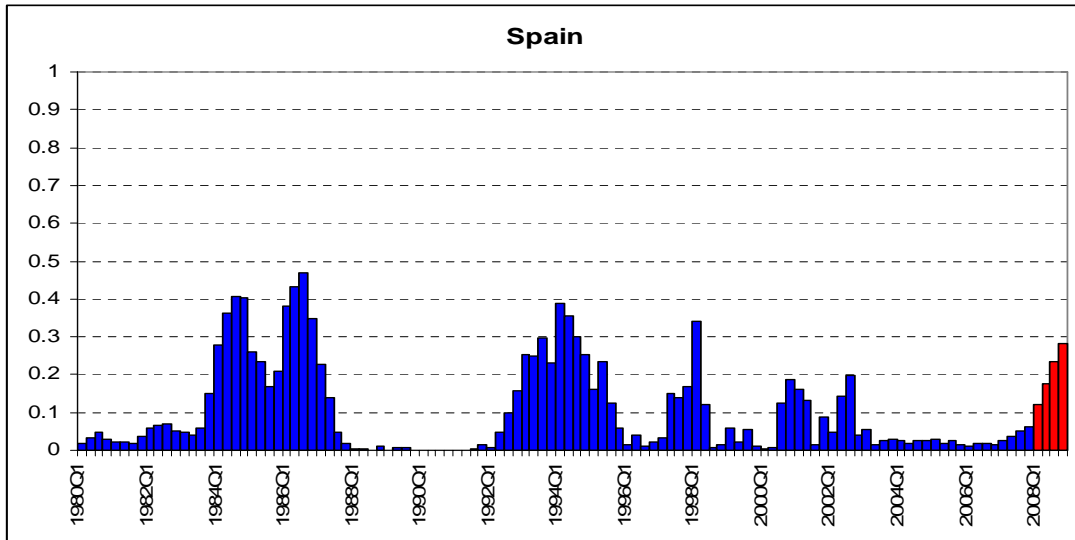
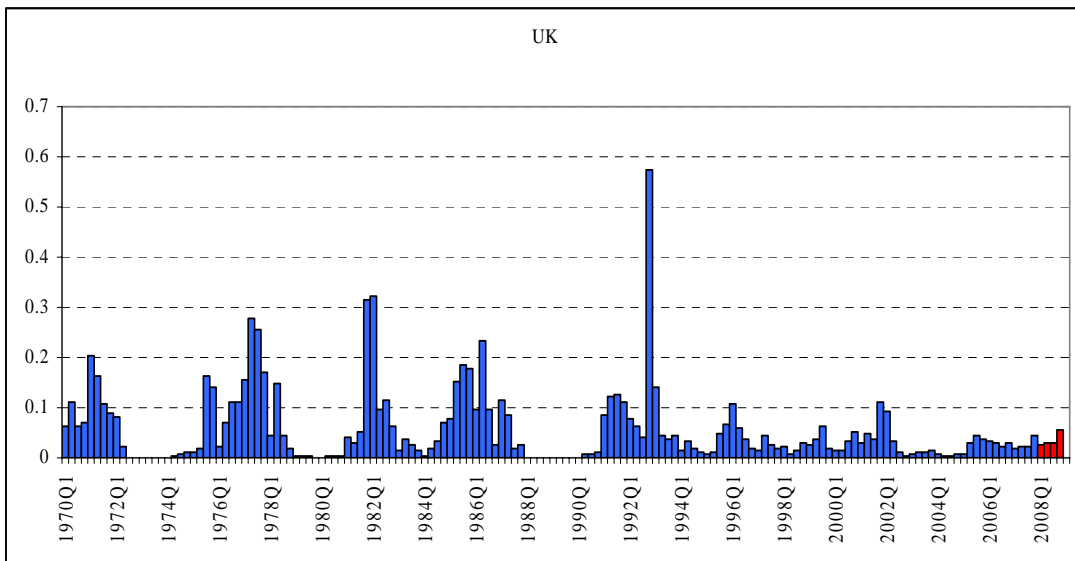


Figure 10. Estimated probability of a bad time (5% left tail) in UK



In other words, the probability of a slowdown in the Spanish economy is still likely even if not so evident as in the US, while the UK does not seem to be at risk.

Risk factor II: The impact of crude oil prices

There is one missing factor in the picture we have drawn up to now: oil prices, which have beaten all records so far in 2008. The experience of two big recessions driven by spikes in the oil price (1973 and 1981) suggests that the present level of oil prices might also have a strong impact on growth.

But which metric provides the best measurement of the potential impact of crude prices on the economy? The best way to measure the impact of oil prices on the purchasing power of importing countries should be the relationship between the price of a barrel of oil and GDP per capita. The number of barrels one year of GDP (per capita) can buy gives an idea of the ‘tax’ oil imposes on OECD economies.

As Figure 11. shows, at the beginning of the 70’s one year GDP (per capita) in the US allowed the purchase in the US of 1,500 barrels of oil, while after the petrol price rise in the following years the purchasing power decreased rapidly to 500 barrels, as the oil price increased more than the (nominal) GDP.

Figure 11.a. Purchasing power as ratio between GDP per capita and oil price - US

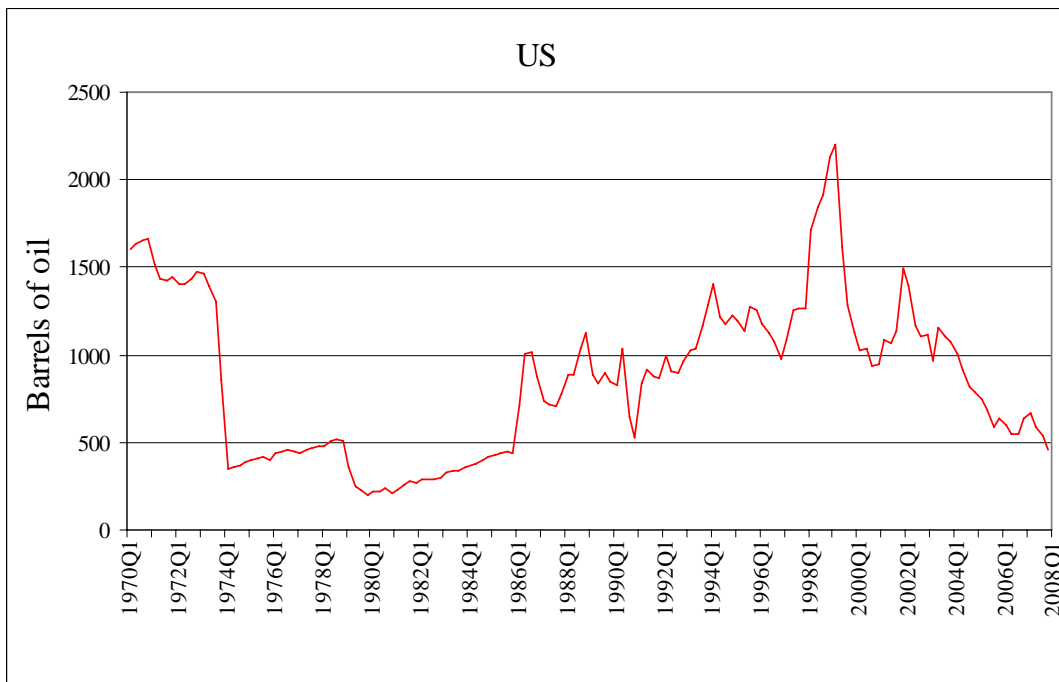
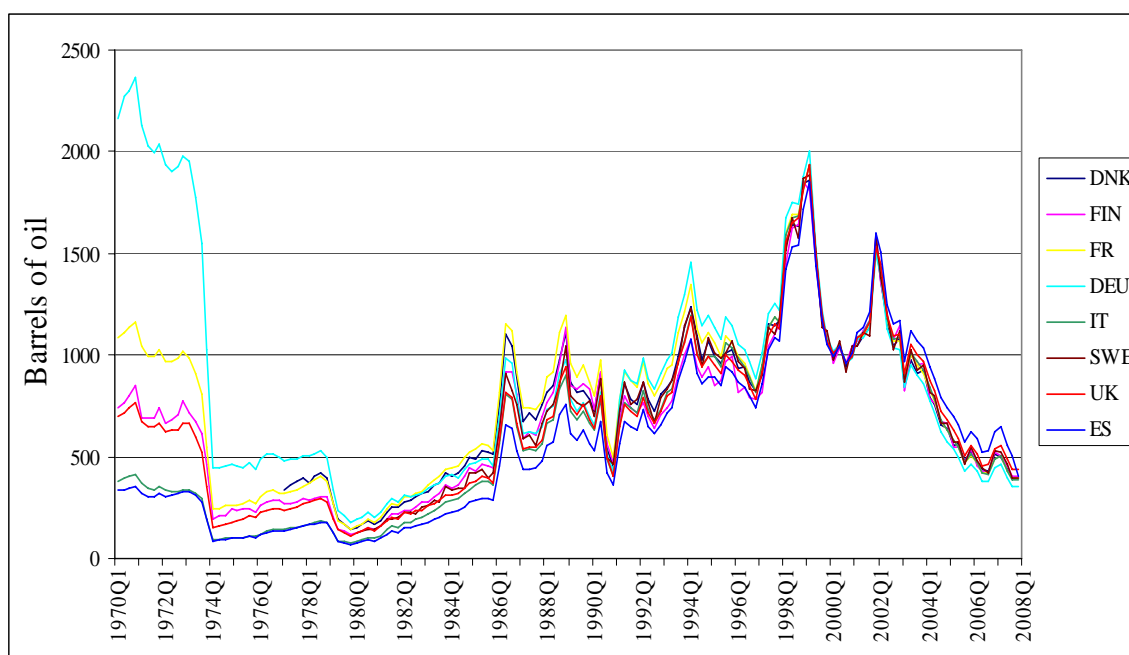


Figure 11.b. Purchasing power as ratio between GDP per capita and oil price- Europe



The second oil shock was followed by a long period of recovery in ‘oil purchasing power’. But at the May 2008 level of oil prices the situation is again similar to that of that of the 1970s, in both the US and in Europe.

More precise features are provided in Table 3 where the actual amount of purchasable barrels in 2007 and the two minima reached in the sample, 1974 and 1979, are displayed. Consumer purchasing power is nowadays still around 400 barrels, still far from historical lows, but if the crude oil price continues to grow at the current speed, the purchasing power in the US in mid-2008 will be down to the level of the 1970s.

Table 3. GDP pro capita/oil price: last published value and the two historical minima

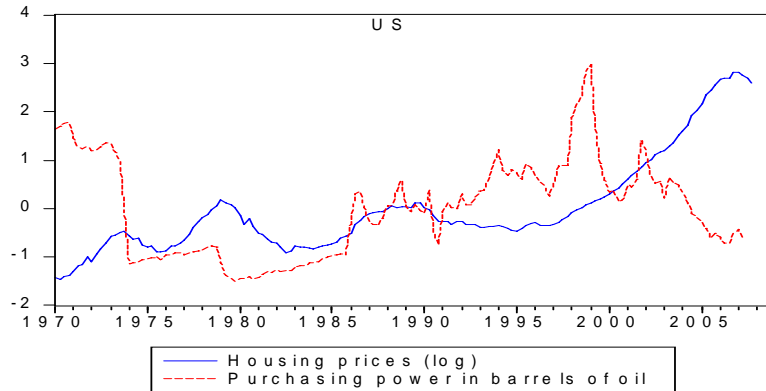
	US	DK	FIN	FR	DEU	IT	SWE	UK	ES
1974Q1	353		191	241	450	91		149	86
1979Q4	195	146	117	141	175	73	130	110	66
2007Q4	454	394	403	392	356	391	395	438	404
Standard deviation	448	379	370	388	535	422	385	387	412

Note: The sample starts from 1997Q1 for Denmark, from 1980Q1 for Sweden, and from 1970Q1 for all the others countries.

If we look at the oil prices dynamic compared to house prices, as shown in Figure 12., we notice that the two peaks of oil prices in the 1970s correspond to a decline in house prices, although with some delay and a sticky dynamic. It is possible that the price-rush was perceived by households as a sign of recession that might eventually have led to a weak demand for durable goods, including houses.

The situation is different for the 1980s period and beginning of the 1990s, where the co-movement of the two indicators could not be detected clearly. The oil and real estate markets are moving in completely opposite directions in the new millennium, maybe as a result of the housing bubble.

Figure 12. Co-movement of housing prices and purchasing power - US



This feature is reproduced in some European countries (Germany, Spain, the UK and Finland) where the two slowdowns in purchasing power in the 1970s are mirrored in the housing market, while in some other countries (Italy, France, Denmark and Sweden) the picture is more confused.

Figure 13. Co-movement of housing prices and purchasing power - Europe

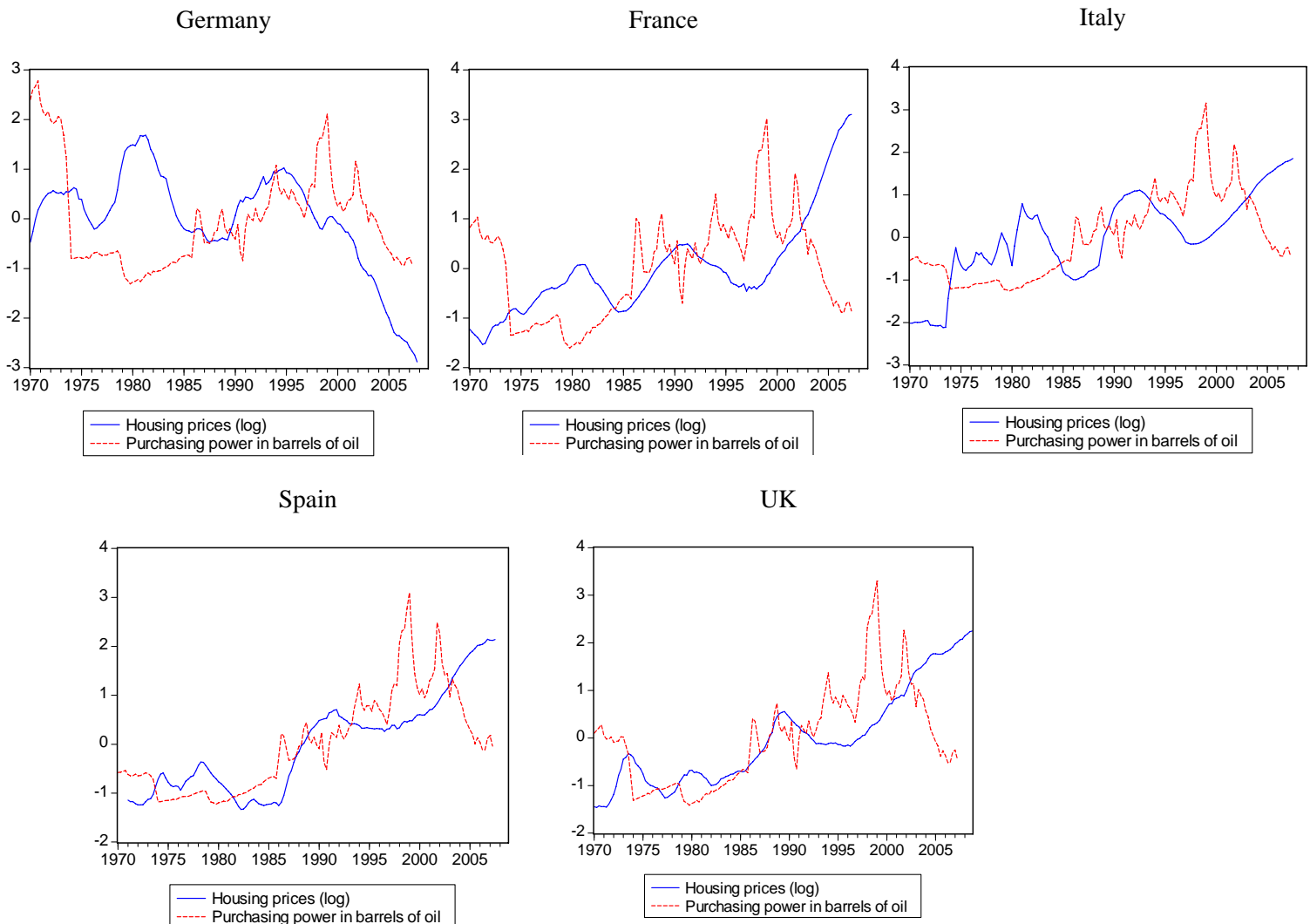


Figure 13 cont. Co-movement of housing prices and purchasing power –Europe

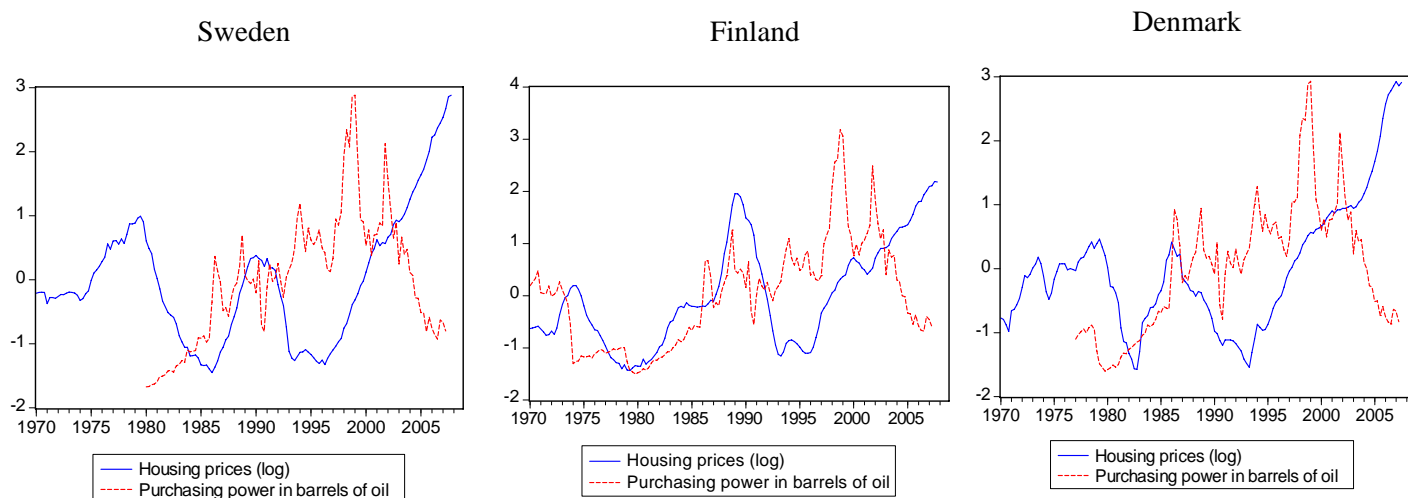


Table 4. Ordered probit estimates for good/bad times

Sample	Country	GDP in 5% extreme tails			GDP in 10% extreme tails		
		House prices	Investment in housing	Oil purchasing power	House prices	Investment in housing	Oil purchasing power
1970Q1:2007Q3	US	50.75 **	15.139 **	0.00122 *	40.186 **	7.794 **	0.00018
1988Q2:2003Q1	SWE	0.28 **	0.003	0.00134	0.214 **	0.009	0.00064
1977Q1:2007Q2	DNK	0.12 **	0.015	-0.00012	0.105 **	0.010	-0.00026
1975Q1:2007Q3	FIN	0.35 **	-0.005	-0.00135	0.205 **	-0.030	-0.00038
1980Q1:2007Q3	ES	0.09 **	0.074	-0.00132 **	0.091 **	0.198 **	-0.00114 **
1978Q1:2007Q2	FR	0.02	0.211 **	-0.00027	0.048	0.217 **	-0.00033
1980Q1:2007Q3	IT	0.00	0.088	0.00014	-0.001	0.081	0.00028
1989Q4 2007Q3	UK	0.09 **	0.057 **	0.00033	0.131 **	0.083 **	0.00021
1991Q1:2006Q4	DE	0.28	0.171	0.00094	0.273	0.201 **	0.00072

** Significant at the 5% level.* Significant at the 10%. level.

Note: Oil purchasing power is defined as the ratio between GDP per capita and the oil price.

Including oil prices in our econometric model⁴, we find that crude oil prices seem to lead to good/bad times in the US (when we look at strong negative values (5% tail), while the probability of a mild decrease (10 % tail) does not seem to be linked to oil prices (see Table 4).

⁴ We also estimate as a robustness check a model with only oil prices as the explanatory variable. Results are coherent with those reported in the text.

For most European economies there is no significant evidence of oil price impact on extreme GDP outcomes. One reason for this might be that the oil producing countries (essentially the Gulf countries plus Russia) import much more from Europe than from the US. In 2006 imports to the Gulf region from the US amounted to \$45 billion, against imports from the EU of around \$130 billion. Germany's exports, for example, only to the Gulf and Russia were at \$60 billion higher than those of the US (\$47 billion). For most EU countries exports to oil producing countries thus provide a cushion that mitigates the impact of higher oil prices on GDP growth.

Another reason why the US should be more affected by changes in crude oil prices is that the US economy is much more energy intensive, and in particular more oil intensive than Europe. The US and the eurozone have a very similar overall GDP (at current prices \$8,887 and \$13,841, respectively), but the US consumes about 75% more oil than the eurozone countries together (940 million tons in the US against about 550 million tons for the eurozone). This means that productivity of energy use in eurozone is more than twice as high as in the US, i.e. \$25,000 per ton in the former versus only \$9,500 in the US.

Finally there is another reason why oil matters in the US-estimates and not in those for Europe: the price of oil in euro is much less variable than the price in USD. Over the last five years the price per barrel has roughly doubled in euro terms (from around €35/barrel to over €70/barrel), but it has increased by over four times in US terms (from around \$25/barrel to \$130/barrel).

If we compute, as above, the estimated probabilities of a bad time in the US also including crude oil prices with a conservative hypothesis of constant purchasing power, we get a 75% probability of an extreme negative GDP. When we factor in the more likely hypothesis of a decrease in the purchasing power of USD GDP per capita in terms of oil (going down to 400 barrels for the whole of 2008), the same probability reaches 82%. Furthermore, when we include the latest oil prices we end up with an 85% probability of a bad time by the end of 2008.

As for Spain, the only European country with slightly significant empirical evidence, the estimated probability of a bad time adding the crude oil dynamic does not change dramatically in 2008.

As a final argument, it might be worth considering which GDP growth profile for 2008 will bring the US into a bad time scenario. If the trend continues to increase at the average rate of last year, the US economy will enter the bad time in 2009, if the yearly growth never exceeds 1% in 2008.

In conclusion, while a recession for the US now appears imminent, this is not the case for Europe. The last recession in 2001 was an adjustment to a classic investment cycle in equipment, which was common to almost all countries. The present cycle is driven by investment in construction, which has different amplitude and a different impact in Europe and in the US, as our econometric results have shown.

We envisage the high probability of a partial decoupling.

Conclusions

It is now apparent that wide swings in the housing market affect the economy and can lead to 'extreme' or 'exceptional' realisations of GDP (relative to trend). Instead of considering the classic definition of recession, we use a neutral statistical definition of good/bad times for GDP, namely events in the extreme tails (5% and 10%) of the distribution of the output gap (actual minus trend GDP).

Due to the 'great moderation' (i.e. the reduced volatility in GDP in the last two decades) we naturally find in the historical analysis that this type of event is concentrated in the 1970s and

1980s. But we find that an ongoing bust in the housing markets might lead to a return of a higher variability in the output gap.

Starting from the observation that there is visible evidence of co-movement in housing market cycle and output outliers, we estimate a model for the probability that changes in house prices and residential investments lead to good/bad times (extreme output gap events).

We find evidence that the housing cycle leads to GDP extreme events in the US while for most large European countries this is not the case, except for the UK, and, partially for Spain.

Based on the estimated parameters we compute the probability that the ongoing fall in house prices and residential investment in the US leads to an exceptional output gap there. We find that for the US the probability of an exceptional output gap is around 50% based on current data for the housing bust. For Europe, only for Spain do we find a significant probability of a bad time materialising next year. The probability would remain low, lower than 30% if the housing market continues along the relatively smooth path experienced until the end of 2007. However, if we assume for Spain a similar development to that of the US (in terms of house prices and residential investment) the probability of Spain falling on hard times increases to over 85% by the end of 2008.

Given that the two major downturns in the 1970s and 1980s were associated with spikes in the crude oil prices, we include it in our model. In particular we consider the purchasing power of consumers in terms of numbers of purchasable oil barrels, or the ratio between nominal GDP per capita and the oil price.

As before, the oil price seems to matter for the US, while for Europe the relationship is not significant, except (again) for Spain. The probability of having a large output gap developing reaches 82% in the US if one puts oil prices as of the end of 2007 into the model (and would increase further depending on the current, May 2008, level of prices). For Spain adding the oil price does not lead to a significant increment of the probabilities computed before. The much reduced impact of oil on European economies is not surprising in light of the fact that European exports to oil-exporting countries are much larger than those of the US.

The main conclusion is that it is highly likely that a large output gap will develop in the US, even if it can technically avoid a recession. The results also suggest at least that a partial decoupling should be expected since in Europe (with the exception of Spain) neither the housing markets nor the price of oil play the same role as in the US.

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